

$$\begin{aligned}
 & \text{Ex 01} \\
 & 5n + 3\sqrt{n+1} \\
 & \epsilon < \frac{1}{2m} \qquad \qquad \qquad \frac{1}{2} < cm
 \end{aligned}$$

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$$\begin{aligned}
 & \underbrace{5n + 3\sqrt{n+1}} \\
 & \quad \underbrace{3\sqrt{n} < 3n} \\
 & \quad \quad 1 < n \\
 & 5n + 3\sqrt{n+1} < 5n + 3n \\
 & m < \frac{5n + 3n}{5n}
 \end{aligned}$$

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$$\begin{aligned}
 & n^2 \quad n^3 \quad n^2 \in O(n^3) \\
 & \lim_{n \rightarrow \infty} \frac{n^2}{n^3} = 0 \quad \text{by } \sqrt{n} \\
 & \text{by } n \quad \sqrt{n} \\
 & \lim_{n \rightarrow \infty} \frac{n \sqrt{n}}{n^2} = 0
 \end{aligned}$$

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$$\begin{aligned}
 & n \rightarrow 2m \\
 & (2m)^2 = 4m^2 \\
 & \frac{4m^2}{m^2} = 4
 \end{aligned}$$

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Ans = 0  
 for  $i = 0$   
 $i < n, i = i + 1$   
 for  $j = 0$   
 $j < n, j = j + 1$   
 $A_n = A_{n-1} + i \cdot j$   
 return

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$$Ans = \sum_{i=0}^{n-1} \sum_{j=0}^{n-1} i \times j$$

$$Tc = \sum_{i=0}^{n-1} \sum_{j=0}^{n-1} 1$$

$$\sum_{i=0}^{n-1} n = n^2$$

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$$n^{2.5} > n^2 \log n$$

$$n^2 n^{0.5}$$

$$n^2 \sqrt{n}$$

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$$X(n) = X(n-1) + 5 \text{ for } n > 1, X(1) = 0$$

$$X(n-1) = X(n-2) + 5$$

$$X(n) = X(n-2) + 5 + 5$$

$$X(n-2) = X(n-3) + 5$$

$$X(n) = X(n-3) + 5 + 5 + 5$$

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$$X(n) = X(n-3) + 3 \times 5$$

$$X(n) = X(n-i) + i \times 5$$

$$n - i = 1 \Rightarrow i = n - 1$$

$$X(n) = X(1) + (n-1) \times 5$$

$$X(n) = 5(n-1)$$

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$$S(n) = 1^3 + 2^3 + \dots + n^3$$

$$S(1) = 1$$

- define the recursive relation of S(n)

$$S(n) = 1^3 + 2^3 + 3^3 + 4^3 + \dots + (n-2)^3 + (n-1)^3 + n^3$$

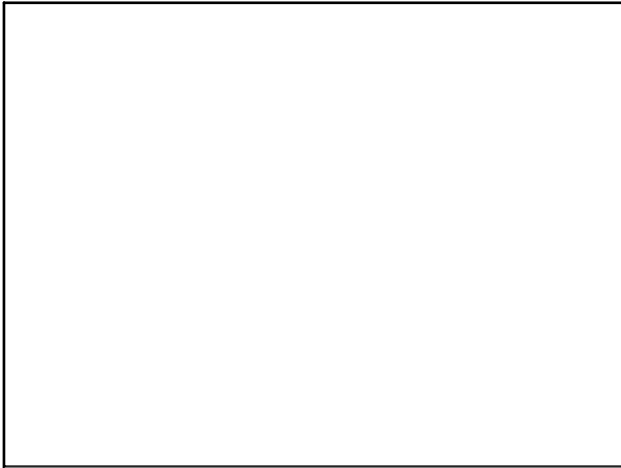
$$S(n) = S(n-1) + n^3$$

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```

S(n)
{
  S = 0;
  for i = 1 to n
    S = S + i * i * i;
  end
  return S;
}
    
```

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Algorithm  $S(n)$   
 if  $n = 1$  return 1  
 else return  $S(n-1) + n \times n \times n$

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$M(n)$   
 $M(n) = M(n-1) + 3$   
 $M(n-1) = M(n-2) + 3$   
 $M(n) = M(n-2) + 2 \times 3$   
 $M(n) = M(n-3) + 3 \times 3$   
 $M(n) = M(n-i) + i \times 3$

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$M(n) = M(n-i) + 3i$   
 $M(1) = 0$   
 $n - i = 1 \Rightarrow i = n - 1$   
 $M(n) = M(1) + 3(n-1)$   
 $M(n) = 0 + 3(n-1)$   
 $M(n) = 3(n-1)$

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